Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada

Vol.2 No. 2 November 2011



# Agroforestry News from the Atlantic and Quebec

## "Cross-cultural" systems!

Agroforestry is increasingly being referred to in various fields of interest: agriculture and forestry, the environment, land use, community development, watershed-based integrated management, etc. The principle of agroforestry couldn't be simpler: intentional integration of tree and shrub plantings with crops or livestock. Simple, and yet complex!

Interaction between arboricultural and agricultural elements creates quite a range of intercropping systems. These systems generally prove to be more sustainable than conventional cropping systems because they are more diversified and resilient while increasing overall biological productivity. They also produce a larger variety and quantity of goods and services, which diversify farming income and benefit communities.

Agroforestry is versatile. In contexts of extensive farming or devitalized rural sectors, agroforestry develops local resources and improves economic activity through recultivation of fallow land, production of wood and biomass for energy, production of non-timber forest products (NTFPs), landscape gardening, agro-tourism development, etc. These activities are compatible with a local economy based on niche agri-food production and short marketing channels.

There are also many benefits to be reaped from agroforestry in areas where intensive farming is practised. Agroforestry systems contribute to conserving soil and water, improving microclimatic conditions, increasing resistance of crops to disease, and promoting pollination. These systems benefit the environment by filtering pollutants and sequestering carbon. They also help producers and society in other ways by lowering heating costs for farm buildings, reducing snow removal costs and improving safety on roads, and controlling livestock odour.

This issue of *Agroforestry News* deals with various crops and practices in Quebec and the Atlantic provinces, but with a "cultural" openness to North America and the world. In this issue, you will read about Canada yew cultivation. An article from Quebec presents a riparian agroforestry system that uses trees to improve the habitat of—a fish! Contributors from the Atlantic region report on projects involving biomass harvesting, evaluation of new tree nut species, research into new uses for underutilized biomass produced on farms, and the creation of a regional exchange group in the bioenergy sector. This issue also includes a report on the publication of a technical leaflet on intercropping systems by researchers from Quebec and Ontario. From the Prairie provinces comes a report on the 2009 World Congress of Agroforestry held in Nairobi, Kenya. Welcome to the world of agroforestry, and happy reading!

Stéphane Gariépy
Chris Pharo

## IN THIS ISSUE



Canada

# Feature article

## The Tumultuous Story of a Humble Shrub — Canada Yew

Canada yew (*Taxus canadensis*) is a low-spreading, slow-growing shrub found in forests of Quebec, Ontario, Atlantic Canada, and the northeastern United States. Although the plant was known for its medicinal properties in Aboriginal culture, it was not used in modern medicine until the 1990s. Paclitaxel is the active compound extracted from yew plants and used in cancer chemotherapy. The compound was initially isolated from the bark of the Pacific yew (*Taxus brevifolia*).

The first chemotherapy product containing paclitaxel was commercialized in 1992. Since Pacific yew was not abundant enough to meet the growing demand for paclitaxel, other species of yew were examined for their content. Quebec's Institut Armand Frappier initially determined the paclitaxel content of Canada yew leaves in the early 1990s. The plant's foliage turned out to be a good source of paclitaxel, and it began to be harvested in the Gaspé peninsula. Harvesting soon expanded to northern New Brunswick and Prince Edward Island to meet the demand from pharmaceutical companies.

Canada yew.
Photo: Stewart Cameron

In 2000, the value of purified paclitaxel was estimated at US$300,000/kg, and harvesters of Canada yew were paid approximately $2.75/kg. Concerns about yew harvesting methods led to the creation of the Canada Yew Association which published harvesting guidelines. Members of the organization support sustainable harvesting of the plant and promote Canada yew on international markets. In 2001, the harvesting of shrubs intended for pharmaceutical products was included in sections 24.0.1 and 24.0.2 of Quebec's *Forest Act* and Canada yew was the main target of the amendments. Three companies were then allowed to harvest yew branches

Canada yew under a forest canopy.
Photo: Stewart Cameron

on the province's Crown land and had to comply with a number of requirements to obtain the necessary permits.

The yew market outlook deteriorated somewhat between 2001 and 2008 due to the use of semi-synthetic paclitaxel and international competition. Despite these shortcomings, the yew harvest continued until 2006, mainly on private land. By then, many Canadian and American paclitaxel processing companies had ceased operating.

The companies that were able to continue harvesting yew have improved the efficiency of their operations and refined their product. In 2009, purified paclitaxel was worth US$100,000/kg, and the price paid to harvesters had dropped to $1.30/kg. In 2009, the Canada yew industry was estimated to be worth $9 to 11 million. It remains to be seen how it will evolve in coming years.

For more information on the Canada yew, please contact:

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Natural Resources Canada, Canadian Forest Service – Atlantic Forestry Centre, Fredericton, New Brunswick

# In the wind from Quebec

## CRAAQ Agroforestry Committee

The primary mission of the Centre de référence en agriculture et agroalimentaire du Québec (CRAAQ) is to promote dialogue among its expert members and among agricultural and agri-food organizations in order to disseminate integrated knowledge, design and distribute reference tools, and foster agriculture and agri-food networking.

In 2009, the CRAAQ announced the creation of an Agroforestry Committee resulting from collaboration between agroforestry leaders from the agriculture, forestry, environment and rural land use sectors. The Committee is made up of about 20 practitioners, developers, researchers and managers from the Estrie, Montérégie, Mauricie, Québec City, Bas-du-Fleuve and Gaspé regions. Since 2009, the Committee has developed its structure and adopted an action plan to facilitate the coordination of certain research activities and streamline information and technology transfer to advisors and producers.

On March 3, 2010, the Committee held its first activity, a one-day forum that examined knowledge on issues, obstacles and solutions related to agroforestry information acquisition and transfer for three agroforestry technology families: environmental service systems, such as windbreaks and riparian agroforestry; agrosilvicultural systems, such as intercropping; and production systems for non-timber forest products. The forum also encouraged discussion and networking among the 80-odd participants.

For 2011, the Committee plans to initiate a network of demonstration sites, develop a directory of agroforestry stakeholders, and organize another technical and scientific agroforestry event.

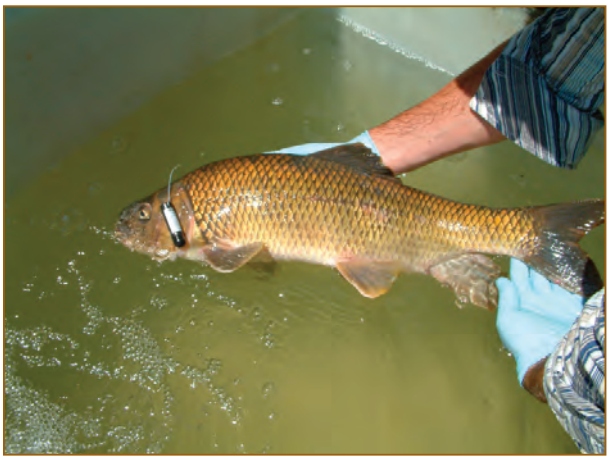
For more information or to download the presentations given at the forum, visit the Agroforestry Committee page on the CRAAQ Web site:
www.craaq.qc.ca/Comites/Comite-agroforesterie

Source:
Stéphane Gariépy, AAFC
Joanne Lagacé, project leader, CRAAQ

## Can trees be used to help a fish?

The copper redhorse (*Moxostoma hubbsi*) is a species of fish that lives nowhere in the world except in the Quebec portion of the St. Lawrence plain. The species is considered threatened under the Quebec *Act Respecting Threatened and Vulnerable Species* and is listed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The only two known spawning grounds of the copper redhorse are located in the Richelieu River, one of which is the Chambly Basin. Poor water quality in the tributaries and sedimentation from riverbanks and adjacent fields are among the known causes of the deterioration of the species' breeding and feeding habitats.



Copper Redhorse. Photo: MRNF et ZIP des Seigneuries

From 2005 to 2010, Agriculture and Agri-Food Canada (AAFC) received annual financial aid from Environment Canada's Interdepartmental Recovery Fund (IRF), the goal of which is to implement recovery activities for species at risk under federal jurisdiction. It is in this context that AAFC's Regional Adaptation and Practice Change Division, Quebec Region, is working with various partners to improve copper redhorse habitat. These partners include the Comité de concertation et de valorisation du bassin de la rivière Richelieu (COVABAR), the Club ConseilSol, the Des Seigneuries area of prime concern committee (ZIP), the copper redhorse recovery team, and other agricultural and environmental departments and organizations. In practical terms, the objective of this partnership is to characterize watercourses that are considered priorities, carry out riverbank renaturalization and stabilization, and conduct outreach.

Since 2005, some 1,800 structures have been built. Wattle fences, fascines and brush mats have been installed, riverbanks have been mechanically reshaped, and over 6,200 trees and shrubs have been planted. The work covers the most severely deteriorated banks

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## Copper Redhorse

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of certain watercourses in the Richelieu River watershed, along Richer Brook, Beloeil Brook and the Rivière des Hurons. In 2008, an agroforestry component was incorporated into the project to encourage the establishment of larger wooded riparian strips.

Following a feasibility study produced in 2009 by Biopterre, a bioproduct development centre, various scenarios for riparian agroforestry systems were developed to benefit farmers and support ecological functions at the same time. The project's regional partners network then helped identify an agricultural producer interested in implementing a riparian strip demonstration site along the Ruisseau à l'Ours in the priority sub-watershed of Rivière des Hurons. The agroforestry systems are approximately 10 metres wide and 750 metres long. Several different development scenarios have been put in place using a variety of different species, mainly commercial hardwoods and shrubs.

Main species making up riparian forest buffers:

| | |
|---|---|
| Sugar maple | White willow |
| American white ash | American ederberry |
| Green ash | Highbush cranberry |
| American linden | Black walnut |
| Black chokeberry | Shagbark hickory |
| Siberian peashrub | Dogwood |
| Common ninebark | |

As it grows, the forest cover provides shade, which lowers water temperature, protects the shorelines from erosion and promotes aquatic habitat restoration. After 40 to 50 years, according to the scenarios, the various tree strata implemented will be ready for harvest, making this vegetation cover a multi-functional and economically viable environment. The project is being carried out with the perspective of spreading this practice to watersheds on a larger scale in order to gradually create an extended network of ecosystems that will protect the copper redhorse habitat at the source.

Source:
Marcel Comiré, COVABAR
Stéphane Gariépy, AAC
Stéphane Lamoureux, Club Conseil-Sol
André Vézina, Biopterre

## A Well-Kept Secret in Centre-du-Québec: Edible Nut Trees

Since 2007, the Regroupement agroforestier centricois (RAC) has been working to increase the number of nut tree plantings, particularly black walnut. Thanks to the support of various partners over the years, particularly the Association forestière des Cantons-de-l'Est and the Société sylvicole Arthabaska-Drummond, several thousand black walnut trees have been planted on the land and in the forests of the group's members.

The ultimate goal of this initiative is to establish a regional network of nut orchards to profitably produce this high-quality non-timber forest product as part of an agroforestry system. However, it is likely that there is already an unknown and sufficient quantity of nut trees in Centre-du-Québec region woodlots to allow for harvesting of this natural resource in the short term. With this objective in mind and with Biopterre's scientific and technical support, the RAC surveyed existing nut trees in the region's five Regional County Municipalities in 2009−2010.

Objectives of the study:

- Survey existing nut tree species and cultivars in Centre-du-Québec's five RCMs;
- Validate hardiness and productivity parameters;
- Issue recommendations on conserving and harvesting this existing natural heritage;
- Develop a plan for establishing nut orchards; and
- Draw up a schedule for producing nut trees and planting walnut and hazelnut orchards.

The first step was to survey residents to gather as much information as possible on property owners who have nut trees on their land. A notice published in the newspapers invited nut tree owners to inform the RAC team so they could include them in the survey. Many people answered the call, and hundreds of trees were identified at 57 separate sites, a good many of which were in urban areas.

The Agence forestière des Bois-Francs also helped out by providing all of the reports on authorized black walnut, butternut and burr oak plantings from the early 1980s to the present. This information made it possible

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## Edible Nut Trees in Centre-du-Québec

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to locate close to 95,000 nut trees, including almost 13,000 that had already reached the required maturity to produce nuts (12 years for black walnut, 20 years for butternut, and 35 years for bur oak).

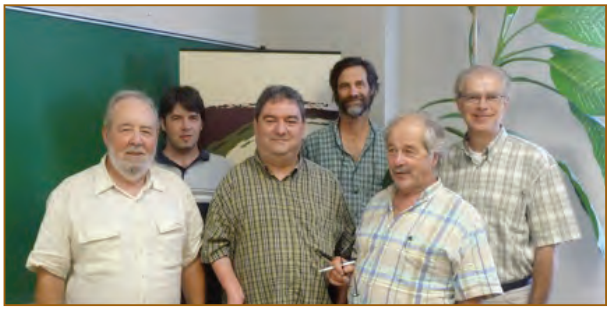
In conclusion:

- The survey was a crucial step in establishing the potential nut harvest in Centre-du-Québec.
- The public's active participation and clear interest expressed during the survey has motivated the RAC to consider subsequent steps on the road to establishing an edible nut orchard network in the region.
- It is now important to gather more information on this resource by checking the condition of sites authorized by the Agency in recent decades—which could not be done in the first campaign—in order to assess the production capacity of these trees more accurately.
- According to current estimates, it would be possible to harvest over 2,000 tonnes of nuts in the region within a few years.
- This is a promising agroforestry activity that could make Centre-du-Québec one of the leading producers of edible nuts in Quebec.

Source:
Gilles Théberge
Regroupement agroforestier centricois (RAC)
gilles.theberge@tlb.sympatico.ca

## Edible Nut Trees: A Key Partnership Agreement

In August 2010, a partnership agreement was signed between the Regroupement agroforestier centricois (RAC), the Société sylvicole Arthabaska-Drummond (SSAD), and Biopterre, a bioproduct development centre in La Pocatière. The agreement provides for the establishment of a specialized nursery and nut and hazelnut orchard in Centre-du-Québec. These facilities will be used for tree, shrub and nut production and reproduction, as well as research and development activities.



The signatories of the agreement, from left to right: Gilles Théberge, RAC President; Louis-Alexis Théberge, forestry technician in charge of RAC operations; Jean Page, SSAD Executive Director; Guy Langlais, DTSN, Biopterre project manager; Jean-Pierre Auclair, SSAD Vice-President; Hervé Bernier, P.Eng., M.Sc., Executive Director of Biopterre.

More than 99% of edible nuts consumed in Quebec are imported, and no true nut orchards currently exist in the province. This agreement, and the resulting projects, will help change this situation while developing Centre-du-Quebec's forests and contributing to the region's economic and social development.

Biopterre will supervise the research activities, and the RAC will plan the nursery and orchard to meet the initiative's objectives. SSAD is providing four hectares on its property near the Saint-Albert educational forest.

The partners involved in this innovative agreement believe that it is a crucial step toward multi-resource harvesting of our forests, particularly non-timber forest products in the region.

Source:
Gilles Théberge,
Regroupement agroforestier centricois (RAC)
gilles.theberge@tlb.sympatico.ca

# Waves From the Atlantic

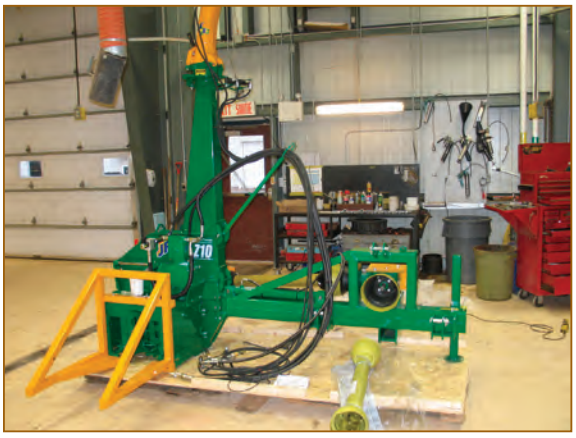
## Willow Harvester: the Last Piece of the Puzzle

After more than four years of field research confirming the environmental protection provided by willow buffer strips, Agriculture and Agri-Food Canada's Agri-Environment Services Branch (AESB) was ready to take a big step forward. The purchase and delivery late last year of a willow harvester and chipper is the last piece of the puzzle needed to support the region's farmers in their efforts to protect waterways.

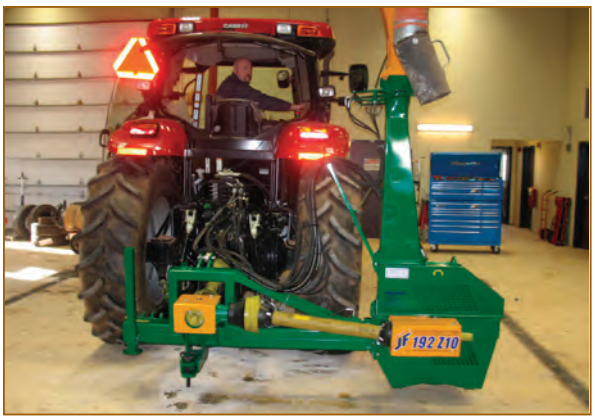
> "Up until now the only missing piece in building greater acceptance of willow buffer strips was how to harvest the willows efficiently using farm-scale equipment, at the right cost," said Chris Pharo, Regional Manager, Sustainable Agri-production Systems at AESB in Atlantic Canada.

Which brings us to the Ny Vraa Type 192 single-row willow harvester. After several months of research and talking to agroforestry specialists at the AAFC's Agroforestry Development Centre, AESB purchased this one-row harvester-chipper from a Danish supplier.

> "This piece of equipment fills that gap," said Mr. Pharo. It can be pulled by an average-sized tractor. It cuts and chips willows and blows the material into a wagon, all at a price equal to the cost of a new pick-up truck. "It is user friendly, a one-man operation, much like harvesting corn silage," said Mr. Pharo.



Ny Vraa Type 192 one row willow harvester.
Photo: Chris Pharo



The willow harvester hooked up to a tractor.
Photo: Chris Pharo

In 2006, AESB established two demonstration projects on potato farms in Prince Edward Island in partnership with the PEI Soil and Crop Improvement Association to evaluate the effectiveness of growing willow strips in riparian areas to catch excess nitrogen and phosphorus and reduce surface runoff. "The data collected from project monitoring shows the willows are holding up their part of the bargain," said Mr. Pharo.

Project results show willows are ideal for buffer zones. They grow back quickly and are excellent at absorbing excess nutrients that could leach into waterways. Depending on the species and growing conditions, harvest can occur after a three- to seven-year cycle. The goal is not only to implement a beneficial management practice on the farm, but also to provide a source of renewable energy for farmers and reduce the reliance on fossil fuels. The willows will be chipped and burned in farm buildings.

> "We know how to plant willows, how they perform and why they are a good fuel source," said Mr. Pharo. "We are seeing some of the highest yields ever recorded in Canada for willow biomass production."

The new equipment arrived in December 2010, and Mr. Pharo worked the kinks out of the new gear at AAFC's Harrington Research Farm, north of Charlottetown, with plans for full-blown field days in the fall to demonstrate the harvester. "We want to have farmers see it in action. We'd like to have it in as many hands as we can," said Mr. Pharo, who plans to make the equipment available to interested farmers.

The PEI Department of Agriculture has established some willow sites on high-sloping land that will be ready for harvest in the fall of 2011. There are four or five different farms that could use this equipment. AESB is also looking at establishing willow sites in Nova Scotia and New Brunswick.

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## A Willow Harvester

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Mr. Pharo is excited about the prospect of having the harvester available and the springboard effect it will have in getting more farmers to undertake willow planting on farms to reduce nitrogen leaching into groundwater but also to produce renewable energy.

> "Now that we have a harvester in the region, we can show farmers how to manage and harvest and let the farmers see that this makes sense," said Mr. Pharo.

He believes that as a beneficial management practice, the harvester will have both environmental and economic benefits for farmers. "We are growing renewable energy in areas on the farm where row crops may not be an option due to slopes or other restrictions."

> For more information, please contact:
> Chris Pharo, chris.pharo@agr.gc.ca

Source: John Morrison, AAFC

## Chestnuts – A New Crop for PEI

Interest in agroforestry and new crops as well as concern over environmental/sustainability issues with steeply sloping land used for row crops resulted in the establishment of a number of demonstration and research sites across PEI starting in 2003.

A 15- to 20-year-old American chestnut tree in southern Ontario. Photo: William Glen

All of the projects, sponsored by the PEI Soil and Crop Improvement Association (PEISCIA), were established on private land in collaboration with land owners. AAFC (Delmar Holmstrom, Researcher) collaborated on these projects, one of which has to do with the American Chestnut (*Castanea dentata*).

Chestnuts are widely used in North America. Past usage was more extensive as the nuts served as a staple in the daily food diet of people. The nuts were gathered in the fall and dried, ground into flour and used in making bread. Since the wood is as strong but lighter than oak and is rot resistant like cedar, chestnuts were used for a variety of purposes, including high quality furniture, shingles, home construction, flooring, piers, plywood, and utility poles. In addition, American Chestnut trees reportedly grow 30% faster than oak trees and once cut will regenerate from the stump quite readily.

Chestnuts belong to the beech family and are not related to the horse chestnut trees found locally (their nuts are not edible). American chestnut trees were widespread in the eastern United States in the early 1900s. Unfortunately, the introduction of chestnut blight around 1900 wiped out the majority of the American chestnut trees in the first half of the 20th century. As a result, most chestnuts sold in stores today are imported from Europe or China, where the trees have some resistance to blight.

American chestnut blight. Photo: William Glen

Beginning in the early 1900s, researchers began hybridization of the blight-resistant Asian chestnut with the American chestnut. They hoped to develop seedlings that would be resistant to blight but retain the properties and climatic tolerance of American chestnut. Researchers also began screening American chestnut plants, hoping to find blight-resistant seedlings. Their work continues to this day.

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## Chestnuts on Prince Edward Island

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In the spring of 2006, an experiment was initiated in Tyne Valley, Prince Edward Island, to compare the survival and growth rates of three tree species: red oak, American chestnut and a hybrid of American and Asian chestnuts. The experimental site was located in a former pasture on a moderately well drained, sandy loam to loam soil with a 7–9% east-facing slope.

PEISCIA has published details about the site, methodology and results of the project on its Web site: www.peiscia.ca

Results have been mixed. The survival rate has ranged from 96% for the hybrid chestnut seedlings to less than 60% for red oak. The American chestnut trees have, on average, more than tripled in height since 2006 (from 58 cm to 2 m), while the surviving red oak trees have gone from an average of 10 cm to 88 cm. Results from another site where American chestnut trees and hybrids were planted in a forest environment are looking more promising. Some trees at that site now measure more than 4 metres.

An American chestnut planted at a forest site on PEI. This 1-m tree planted in the spring of 2006 now measures over 4 m. Photo: Delmar Holmstrom

For more information, please contact Delmar Holmstrom, delmar.holmstrom@agr.gc.ca or Tyler Wright, tmwright@gov.pe.ca

## Not Your Typical Agroforestry Research Partnership

This article briefly discusses the objectives and progress of three research projects being conducted by the Canadian Bio-Energy Centre (CBEC) and the Wood Science and Technology Centre at the University of New Brunswick. The projects are being carried out in partnership with the New Brunswick Department of Agriculture, Aquaculture and Fisheries and Agriculture and Agri-Food Canada through the federal agricultural and agri-food policy, Growing Forward.

### Biomass Pellets

Both farmers and woodlot owners are continually looking for ways to diversify their products. One way that this can be achieved is to find uses for the "waste" or currently underutilized biomass produced during farming operations. Making pellets from agricultural residue is one of those possible uses.

These are the basic steps in the pellet production process:

- Material is collected and dried to a specific moisture content (the target moisture content varies by type of raw material).
- The dried material is ground to a uniform size.
- The ground material is compressed into pellets.

There are several advantages to using pellets as fuel:

- Pellets are compact and contain more energy than the same volume of unprocessed wood or agriculture biomass.
- Pellets are more uniform than unprocessed biomass, and pellet-burning appliances with automated feed systems are already being sold to consumers.

Unfortunately, using agricultural residue as feedstock to make fuel pellets poses some challenges in comparison with forest residue. For example, pellets made from forage crops typically have higher levels of chlorine (Cl) than do wood-derived pellets. These naturally high Cl levels cause problems in the combustion process, increasing corrosion of metal stove parts and the formation of "clinkers," which are lumps of slag that can damage stoves. Similarly, the ash content (the amount of material left after burning) is also higher than with wood pellets.

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## Research Partnerships

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CBEC is currently examining the effects of the site (climate and soils) on the physical, chemical, and energy properties of a number of agriculture residue (straw) from hay, wheat, barley, and oats, as well as a number of other annual and perennial species such as canola, corn, reed canary grass and camelina. CBEC is also studying the effects of current agriculture practices on these properties. Knowing the impact of these factors on pellet quality is the first step towards the goal of producing quality pellets from these materials.

Progress to date includes the production of pellets from all of these agricultural residues. (NOTE: similar research has been done elsewhere, but this is a new activity for New Brunswick). At the same time, the potential use of these pellets for animal bedding is being evaluated.

### Panels

Another ongoing project at the University of New Brunswick's Wood Service and Technology Centre focuses on procedures and methods for making panels from agriculture residue. Led by Dr. Felisa Chan, this is another avenue of research directed at turning waste into value-added products. Progress to date includes the successful development of more environment friendly natural soya-based adhesives to use in the manufacture of the panels.

### Perennial species yield

Lastly, a new initiative is under way to evaluate the growth and yield of several perennial species (Miscanthus and native willows) for their potential as biomass crops. This project is being conducted in cooperation with the private sector and government agencies (the New Brunswick, Nova Scotia and Prince Edward Island agriculture departments), the Canadian Forest Service, and the Atlantic Forestry Centre. Replicated yield trials will be carried out across a range of sites in Atlantic Canada. These trials will provide meaningful yield data and identify new opportunities for producing purpose-grown bio-energy crops for farmers and woodlot owners alike.

These projects are not "typical" agroforestry research ventures, but they show how the agriculture and forestry sectors can work together to generate new income opportunities for rural communities

For more information please contact:
Ron Smith, rsmith1@unb.ca,
telephone: 506-458-7891

Source : Ron Smith, Jerry Viel, Michael Albright and Felisa Chan, University of New Brunswick.

## Atlantic Regional Bioenergy Development Group

During the last decade, the development of alternate or renewable sources of energy to supplement or even replace traditional petroleum-based energy sources has become a desirable goal. The forestry, aquaculture and agriculture sectors have all sought to identify potential biological-based sources that could be used to produce sustainable bioenergy.

In order to help identify and address these challenges, the New Brunswick Department of Agriculture, Aquaculture and Fisheries (NBDAAF) assigned experts to explore and develop the biomass sector for the province. A group of researchers, extension specialists, business development and policy specialists from federal and provincial government departments, institutions and industry members from the Maritimes were brought together in April 2010 at a meeting hosted by the NBDAAF.

The purpose of this initial meeting was to develop a collaborative approach among the Maritime provinces in order to achieve cooperative solutions to priority issues in the area of bioenergy research and policy. This group is working to:

- Identify the most important bioenergy needs for the region.
- Identify specific research, both basic and applied, that should be undertaken.
- Develop a plan to integrate existing information and resources.
- Establish a regional committee including industry members, and identify working groups on research and policy issues and other working groups as required.

The efforts of this group are ongoing and its membership has been expanding. If you would like to join, please forward your contact information to the committee chair, Mike Price, Provincial Forage and Biomass Development Specialist, New Brunswick Department of Agriculture, Aquaculture and Fisheries.

For more information, please contact
Mike Price, mike.price@gnb.ca,
telephone: 506-453-3468

## Blueberry Field Windbreak Maintenance Clinics in the Acadian Peninsula – A Great Success!

In October 2010, two blueberry field windbreak maintenance clinics were held in the Acadian Peninsula. The clinics took place in Tracadie-Sheila and Lamèque. About 30 participants braved the rain and cold to attend. Also on site were two representatives of Biopterre (La Pocatière, Quebec) who specialize in windbreak maintenance and management, and a team from the Eastern Canada Soil and Waste Conservation Centre (ECSWCC)).

Protecting the environment and implementing agricultural best management practices such as agroforestry are very important for producers and can provide them with a means for innovative management. Agroforestry involves the integration of trees or shrubs into an agricultural production system and is currently under development in eastern Canada. The most important agroforestry practice in Gloucester County is undoubtedly the establishment of windbreaks.

> "The shelterbelts provide many environmental and socio-economic benefits when designed and maintained properly," said Jérôme Damboise, an ECSWCC agroforestry advisor. Their primary functions in blueberry production include the improvement of pollination, more uniform distribution of snow, enhanced aesthetic value, and fostering of greater biodiversity.
>
> "Hundreds of kilometres of windbreaks have been established in the blueberry fields of the Acadian Peninsula, and it is now time to do the maintenance," said Maurice Basque, a development officer with the New Brunswick Department of Agriculture, Aquaculture and Fisheries (NBDAAF).

To maximize the effectiveness of windbreaks, it is important to trim and prune the trees regularly to maintain an optimal density. The ultimate goal of the clinics was to show blueberry growers and industry representatives how to properly maintain their windbreaks. To do this, participants were invited to visit different types of windbreaks made from trees of various species and ages. During the visit to his property, Bernard Savoie, co-owner of Services Agricoles Savoie, explained the importance of windbreaks in his blueberry management system to the other participants. At the closing of the second day, Andrée Duclos, owner of Bleuetière Duclos Ltd, was keen to stress the importance of planting trees and good management because, in her words, "Trees are the lungs of the planet."

Training on windbreak maintenance. Photo: J. Damboise.

These clinics were made possible through the collaboration of the following partners: the ECSWCC, the NBDAAF, Biopterre, Bleuets NB Blueberries, and the Club agro-environnemental Bleuet Nord-Est. The initiative was funded by the Northern Economic Development Fund and the NBDAAF..

> For more information on agroforestry and windbreaks, visit the ECSWCC website: www.ccse-swcc.nb.ca

Source: Eastern Canada Soil and Water Conservation Centre (ECSWCC).

## Field Windbreak Planning and Establishment Training Session – A Success

The Eastern Canada Soil and Water Conservation Centre (ECSWCC) is pleased with the outcome of the field windbreak planning and establishment training session held on March 15 and 16, 2010. In its continued efforts to promote and develop agroforestry practices in New Brunswick, the ECSWCC successfully obtained funding to hold the session through the Growing Forward Environmental Management Planning program.

The primary objective of the project was to provide a two-day training session to NBDAAF field staff, agri-environmental club coordinators, and any other person interested in providing windbreak planning advisory services to New Brunswick agricultural producers. The 15 seats reserved for the sessions filled up very quickly. André Vézina, a forestry engineer with the Institut de technologie agroalimentaire (La Pocatière, Quebec), was the main instructor, while Jérôme Damboise with the ECSWCC outlined New Brunswick's experience in agroforestry project design and establishment.

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## Windbreak Training Course

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In past years, field windbreak training in New Brunswick has focused on windbreak maintenance for both natural and planted windbreaks. These training sessions continue to be useful. However, there was also a need for training on field windbreak planning and establishment.

In the evaluation questionnaire, all of the participants indicated that they had found the session very useful and that they were now more comfortable with planning windbreaks. However, many noted the need to create windbreak demonstration sites in New Brunswick to enable them to acquire hands-on experience in windbreak design, establishment and maintenance. They also expressed a desire to visit some of the sites in La Pocatière where windbreaks have been in place for over 20 years.

The ECSWCC would like to thank all of the participants in this session. Having everyone contribute was key to making this an interactive learning activity. The ECSWCC would also like to thank André Vézina for agreeing to share his knowledge and experience, and the NBDAAF for its financial contribution under the Growing Forward Environmental Management Planning program.

For more information please contact Jérôme Damboise by email at jdamboise@umce.ca

Windbreak training session. Photo: J. Damboise.

# Echoes From Around the Planet

## A chance to showcase AAFC and agroforestry to the world

In the summer of 2009, Agriculture and Agri-Food Canada staff, including Bruce Neill and John Kort (Indian Head), Klaas Broersma (Kamloops) and Grant Wiseman (Winnipeg) travelled to Nairobi, Kenya, to attend the 2nd World Congress of Agroforestry.

Following AAFC's involvement with the 1st World Congress in 2004, Dr. Kort and Dr. Neill of AAFC's agroforestry group in Indian Head, Saskatchewan, were invited to help organize the second congress.

As part of the global organizing committee, Dr. Kort and Dr. Neill worked with agroforestry professionals from around the world to stage an event that welcomed 1,200 participants from 97 countries from five continents.

"It really struck me that farmers from all parts of the world understand that having trees on their land is a good thing," said Dr. Kort. "A recent study, by the World Agroforestry Centre, shows that there is more than 10 per cent tree coverage on 1 billion hectares of agricultural land worldwide. This means there is significant tree cover on half the agricultural land in the world, which is more coverage than experts first thought."

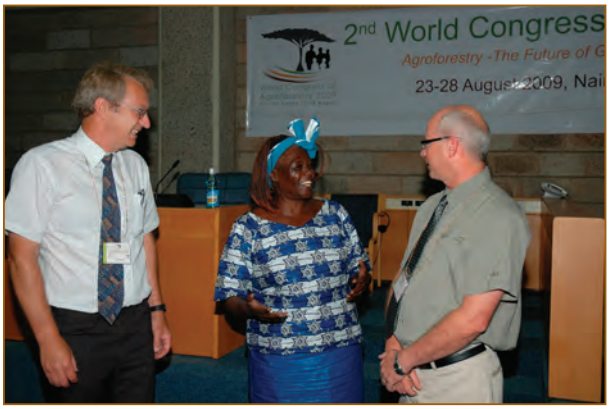
At the congress, AAFC shared its experience with the Prairie Shelterbelt Program, which has been distributing tree seedlings for use in shelterbelts for over 100 years.

Separated by continents, not common interests: During the post-conference tour near Mt. Kenya, Dr. Bruce Neill and a local farmer hug a tree. Photo credits: AAFC Shelterbelt Centre, Indian Head, SK

> "The underlying effect of trees on agricultural land is really quite straightforward," says Dr. Neill. "Trees help stabilize the land from the effects of climate change, such as erosion through drought conditions or heavy rains, strong winds and variable weather. They also protect the natural areas that feed into the water supply (watersheds)."

The former Prairie Farm Rehabilitation Administration (now the Agri-Environment Services Branch or AESB) hit its stride during the Dirty Thirties, when its tree planting and other infrastructure programs helped Canadian farmers through a very difficult drought.

"Seeing the long-term African drought areas gave us a renewed appreciation of what our department and government has contributed to sustainable agriculture over the years," notes Dr. Neill. "If we had not conceived those conservation programs back then, would we today have some of the environmental problems that plague Africa now?"




John Kort and Bruce Neill talking with Professor Wangari Maathai before her keynote address at the World Congress of Agroforestry. Photo: AAFC Shelterbelt Centre, Indian Head, SK

In Africa, the AAFC agroforestry team highlighted Canada's commitment to environmental sustainability. Staff spoke about their extensive experience in tree breeding, program delivery and agroforestry research. It was also a chance to show specific agroforestry practices used by Canadian farmers. For example, Dr. Kort displayed information on "agroforestry for snow management." His was the only poster at the congress that showed snow, which caught a lot of attention!

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## World Congress on Agroforestry

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AAFC also sponsored keynote speaker, Dr. Wangari Maathai, founder of the Green Belt Movement and 2004 Nobel Peace Prize Laureate. She also helped start the internationally renowned "Billion Tree Campaign" in partnership with the United Nations Environment Programme (UNEP).

Through the AESB Prairie Shelterbelt Program, AAFC participated in the Billion Tree Campaign with the delivery of over four million trees in the spring of 2009. That puts the scale of the Department's work into perspective!

For an even greater appreciation, since 1901, over 600 million Prairie Shelterbelt Program trees have been planted by farmers on agricultural land across the prairies—enough to circle the globe 27 times.

Source: John Kort, AAFC

## 11th North American Agroforestery Conference

Over 100 people attended the 11th North American Agroforestry Conference of the Association for Temperate Agroforestry (AFTA), held from May 31 to June 3, 2009, in Columbia, Missouri. The 10th Conference had been held two years earlier in Quebec City, Quebec.

The 2009 conference featured several keynote speakers, breakout sessions and poster and exhibit sessions as well as a one-day tour. The AFTA board meeting and membership meeting were also held during the conference, and a silent auction was held to raise money for AFTA.

Two row planting of pines in silvopasture — AFTA 2009, Missouri. Photo: D. Macauley.

Several Canadians participated in the conference, including three staff members from Agriculture and Agri-Food Canada's (AAFC) Agroforestry Development Centre. AAFC staff presented on the following topics:

Gary Bank – Landscape Characteristics and Wild Pollinators in Canola Production Systems in the Canadian Prairies

Tricia Pollock – Agriculture and Agri-Food Canada Agroforestry Division

Laura Poppy – Communicating the economic and environmental impacts of agroforestry systems.

Agroforestry Development Centre staff also distributed posters and a Centre display was manned in the exhibit area during coffee breaks.

A number of interesting sites were visited during the one-day conference tour, including a stop at the University of Missouri Horticulture and Agroforestry Research Centre, where participants viewed agroforestry projects and demonstrations such as pasturing of cattle in a pine plantation and baling of pine needles for use as bedding. The tour also featured stops in the Columbia area to see intercropping sites where crops were being harvested from between rows/ shelterbelts of nut trees.

Plantations were visited and a very interesting riparian runoff experiment was toured. Participants also visited Shepherd Farms, the Bradford Research and Extension Center, and the Jefferson Public Education Extension Farm to view local farming practices and crops and the integration of agroforestry systems into these areas.

It was an educational conference with many opportunities to network with agroforestry researchers, developers and practitioners from across the temperate regions of North America. In short, the AFTA is a great forum for agroforestry research and development.

For more information on AFTA, visit its Web site: www.aftaweb.org

Source: Laura Poppy, AAFC

# Publications and Resources

## A New Course on Temperate Agroforestry at Université Laval

In January 2011, a new graduate course in temperate agroforestry was offered at Université Laval. The course covers various agroforestry systems adapted to agricultural and forest environments, as well as related systems, particularly as they apply to Quebec. Topics include shelterbelts, wooded riparian buffers, intercropping and silvopastoral systems, and understorey crops, as well as the cultivation of fast-growing trees to produce biomass and the harvesting of non-timber forest products. For each of these systems, themes related to production, economics, ecology, and regional development will be discussed, as well as policy and regulatory issues.

The course will be offered again in January 2012.

For more information, please contact:
Alain Olivier, Professor,
Département de phytologie, Université Laval
alain.olivier@fsaa.ulaval.ca

## Proceedings of the 2009 International Forest Mushroom Symposium

A summary of the 2009 International Forest Mushroom Symposium, held in Québec City from November 30 to December 1, 2009, is available online. Proceedings of the Symposium, including the conference presentations, are also available.

Chanterelles.
Photo: Wendy Cocksedge.

The document (in French only) can be downloaded from the Agri-Réseau Web site (search for “Champignons forestiers”):
www.agrireseau.qc.ca/agroforesterie/

## Cost-Benefit Analysis of Planting Wooded Riparian Strips

This technical leaflet is designed for agricultural advisors and producers intending to set up wooded riparian strips along waterways in rural environments. Using 10 model wooded riparian strips, it helps readers determine whether the net economic benefits are positive for the agricultural producer and, if so, calculate payback periods.

The document was prepared by André Vézina, a professor at the Institut de technologie agroalimentaire in La Pocatière; Frédérick Lebel, a rural economist; and Christian Rivest, an agri-environment technician with the Centre d’expertise sur les produits agroforestiers (CEPAF) in La Pocatière.

This document can be downloaded from the Agri-Réseau Web site:
www.agrireseau.qc.ca/agroforesterie/

## Rural Laboratories – Agroforestry and the Landscape

The main objective of this rural laboratory is to assess the relevance and feasibility of using agrosilvopastoral systems (systems combining tree plantings, crops and pastures) to develop rural areas in the Gaspé, a region where interest in agriculture is low.

Por more information, please contact Bertrand Anel, project coordinator, by telephone at 418-689-6643 or by e-mail at agroforesterie@rocherperce.qc.ca

The report “De la multifonctionnalité de l’agriculture à l’agroforesterie : le projet de mise en valeur de l’espace rural de la MRC du Rocher-Percé (février 2005 – 1 août 2009). Réalisations et réflexions” can be downloaded from the Agri-Réseau Web site:
www.agrireseau.qc.ca/agroforesterie/

## Tree Killers: An Interactive Web Site

Created by Tree Canada, “Tree Killers” is an interactive Web site on invasive plants, insects and diseases that kill or harm trees.

Consult the Web site at:
www.treecanada.ca/tree-killers/

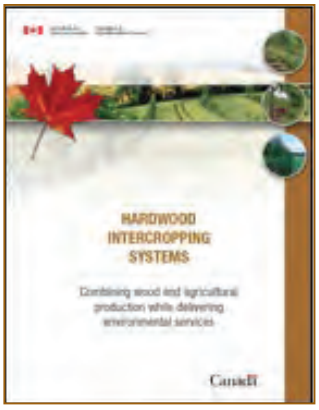
## Presentations at the Agroforestry Forum in March 2010

The CRAAQ Agroforestry Committee held an Agroforestry Forum on March 3, 2010, in Québec City. The objectives of the forum, attended by 80 people, were to present a general update on the current agroforestry situation in Quebec (main issues, current practices, spheres of activity, etc.) and draw a representative portrait of ongoing agroforestry activities in R&D, technology transfer, production, processing, and marketing in various regions of Quebec.

The forum presentations and summary are available on the CRAAQ Web sitewebsite: www.craaq.qc.ca

## Hardwood Intercropping Systems

Hardwood tree intercropping systems involve planting trees in cultivated fields with widely spaced rows (e.g. 10 to 40 meters). Growers can thus cultivate their fields and move machinery around while producing high-quality wood.




These systems provide other benefits, including soil conservation, protection of water resources, carbon sequestration, and crop protection.

The document, which was prepared by D. Rivest, A. Oliver and A. M. Gordon and published by Agriculture and Agri-Food Canada, can be downloaded from the Agri-Réseau Web site: www.agrireseau.qc.ca/agroforesterie/

## A Special Edition on North American Agroforestry

The journal *Agriculture, Ecosystems & Environment* published a special edition on agroforestry in North America in 2009.

The edition was entitled “Temperate agroforestry: When trees and crops get together” and was published under the direction of John Kort, Laura Poppy, Andrew Gordon and Lise Caron, who wrote the preface. It comprises 14 articles selected from presentations at the 10th North American Agroforestry Conference, which was held in Quebec City in June 2007 on the initiative of Université Laval’s Groupe interdisciplinaire de recherche en agroforesterie (GIRAF).

Quebec research is well represented, as five of the selected articles were written by Quebec researchers: Bernier-Leduc et al., Avian fauna in windbreaks integrating shrubs that produce non-timber forest products; Chifflot et al., Molecular analysis of mycorrhizal community structure and spores distribution in tree-based intercropping and forest systems; Duchemin et al., Reduction in agricultural non-point source pollution in the first year following establishment of an integrated grass/tree filter strip system in southern Quebec (Canada); Lacombe et al., Do tree-based intercropping systems increase the diversity and stability of soil microbial communities?; and Rivest et al., Production of soybean associated with different hybrid poplar clones in a tree-based intercropping system in southwestern Quebec, Canada.

This special edition is thus a remarkable showcase for eastern Canada’s contribution to agroforestry research in North America.

*Agriculture, Ecosystems & Environnement*, Vol. 131, nos 1-2, pp. 1-118.

## Report on a Forest Outing in Montérégie-Ouest

The purpose of the September 15, 2010, outing organized by Réseau Ligniculture Québec, the Agence forestière de la Montérégie and the Institut de recherche en biologie végétale (IRBV) was to present the results of research projects on intensive management of hardwood plantations.

A report on the outing can be downloaded from the Agri-Réseau Web site: www.agrireseau.qc.ca/agroforesterie/

# About this Newsletter

## To Submit an Article

For a number of reasons, the publication of this issue was delayed by several months. The production team apologizes for any inconvenience this may have caused to authors and readers and will do everything in its power to make sure that future issues are published in a more timely manner.

We invite you to submit your short news, publication, resource or Web site announcements and any other items relevant to agroforestry for publication in the newsletter.

Please send your material by e-mail to Stéphane Gariépy at stephane.gariepy@agr.gc.ca or Chris Pharo at chris.pharo@agr.gc.ca

Images must be high resolution and provided as separate files (.jpg format or other). Please provide a caption for each image and indicate the name of the person or organization to which the image should be credited.

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Photo credits: The three circles on the first page represent, from top to bottom: The Hope River, Prince Edward Island (photo: Lex Vriend, Ducks Unlimited Canada); agroforestery pioneers Bertrand Anel and Aline Hébert in Val-d'Espoir, in the Gaspé Region, Quebec, (photo: Johnny Huntington); Blood-Root (*Sanguinaria canadensis*) flowers, an understory medicinal plant (photo: Guy Langlais).



ISSN 1918-6967
AAFC Nº: 11421E

Aussi offert en français sous le titre : Bulletin d'information en agroforesterie Québec-Atlantique – Volume 2, numéro 2, novembre 2011.